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NMRC 99-04 April 1999

ESTIMATED DCS RISKS IN PRESSURIZED SUBMARINE RESCUE

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(MED-02)
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REPORT DOCUMENTATION PAGE			*Form Approved* *OMB No. 0704-0188*
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden to Washington Headquarters Services. Directorate for information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302 and to the Office of Management and Budget. Paperwork Reduction Project (0704-0188), Washington, DC 20503.			
1. AGENCY USE ONLY *(Leave Blank)*	2. REPORT DATE April 1999	3. REPORT TYPE AND DATES COVERED Technical 9/96 – 10/97	
4. TITLE AND SUBTITLE Estimated DCS risks in pressurized submarine rescue			5. FUNDING NUMBERS PE – 63713N PR – M0099 TA – .01A WU – 1510
6. AUTHOR(S) Weathersby, P.K., S.S. Survanshi, E.C. Parker, D.J. Temple, C.B. Toner			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **NAVAL MEDICAL RESEARCH CENTER** **(CODE 00)** **8901 WISCONSIN AVENUE** **BETHESDA, MARYLAND 20889-5607**			8. PERFORMING ORGANIZATION REPORT NUMBER **NMRC 99-04**
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) **BUREAU OF MEDICINE AND SURGERY** **(MED-02)** **2300 E STREET, NW** **WASHINGTON, DC 20372-5300**			10. SPONSORING/MONITORING AGENCY REPORT NUMBER DN241126
11. SUPPLEMENTARY NOTES			
12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited			12b. DISTRIBUTION CODE
13. ABSTRACT *(Maximum 200 words)* The Naval Submarine Medical Research Laboratory (NSMRL) Report "Pressurized submarine rescue: a manual for undersea medical officers" issued in 1992 contained a number of decompression procedures with a conservatism appropriate to routine U.S. Navy diving operations. Current planning emphasizes the need for procedures that, although sub-optimal from some viewpoints, allow maximum efficiency in protecting survivors from life-threatening decompression sickness (DCS). Available probabilistic decompression models were applied to six relevant rescue scenarios to estimate DCS risk incurred when making operational tradeoff decisions. Estimates show that oxygen breathing for a few hours during the decompression, and near-immediate post-surfacing use of U.S. Navy Treatment Tables are both quite effective. Much less efficacy is predicted for oxygen breathing after multi-hour surface intervals.			
14. SUBJECT TERMS Submarine, decompression sickness, risk prediction, probabilistic modeling			15. NUMBER OF PAGES 52 16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT Unclassified

NSN 7540-01-280-5500

Standard Form 298 (Rev 2-89)
Prescribed by ANSI S10 239-98
298-102

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ACKNOWLEDGEMENTS

This was supported by the Naval Medical Research and Development Work Unit 63713N M0099.01A-1510. The opinions and assertions contained herein are the private ones of the author and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

LIST OF ABBREVIATIONS

ATA	Atmospheres absolute, is approximated in seawater as 33 fsw
DCS	Decompression Sickness
DISSUB	Disabled Submarine
fpm	Feet per minute
fsw	Feet of sea water
HIO2A	USN93 DCS model variant which accounts for oxygen's effect of slowing nitrogen excretion times
HIO2B	USN93 DCS model variant which accounts for oxygen's contribution to the overall inert gas load
N_2-O_2	Nitrogen-oxygen (aka Nitrox) gas mixtures, used in varying percentages as diving breathing gas
P(DCS)	Probability of decompression sickness
PO_2	Partial pressure of oxygen, expressed in atmospheres absolute
USN93	A probabilistic-based DCS model based on a collected database of 3,322 human dives
USN TT6	U.S. Navy Treatment Table No. 6

BACKGROUND

Rescue of surviving crewmen from a disabled submarine will involve a tradeoff among many medical and logistical considerations to maximize survival while using available but limited resources. The on-scene rescue commander will benefit from an array of tools to estimate the adverse consequences of possible actions. This report provides a range of estimates for one such consequence, that of the survivors suffering from decompression sickness (DCS).

A 1992 report addressed the same question of DCS risk in submarine rescue (1). The usefulness of that report is already limited, because recommended procedures assumed the availability of rescue platforms no longer available to the Navy. Furthermore, the predicted level of safety in many of the recommendations was one considered appropriate for routine Navy diving operations. The level of "acceptable safety" in an actual accident might well be different and multiple options should be made available for both preplanning and operational decision support.

The material in this report is based on unverified prediction. Many of the foreseeable scenarios in submarine rescue are too extreme to permit ethically acceptable human testing. Even if ethically permissible, actual testing of the myriad combinations of procedural variables would necessitate a test program of thousands of human experiments; clearly an impractical approach. In this report we provide predictions based on the best available mathematical models of DCS risk, which have been calibrated with and verified against prior experimental human dives. The models are then used to extrapolate beyond the calibration region into areas where verification is impossible. Known strengths and weaknesses of these models are identified where appropriate, but an ultimate accuracy of extrapolated predictions cannot be determined.

MODELS AND PARAMETERS

All models are of the risk/survivor function family, where the history of individual depth and inspired gas composition leads to a prediction of the probability of DCS, or P(DCS). The formalism is appropriate to DCS itself, where an increasingly severe decompression causes DCS symptoms in a greater fraction of the exposed population. A probabilistic approach is preferable to older models, which produce a discreet, but arbitrary, boundary between “safe” and “unsafe” conditions. Non-probabilistic methods do not allow for the underlying variability in DCS risk, nor are they capable of predicting outcome for novel scenarios.

The probabilistic models, their underlying equations, and details of their construction and calibration have been published elsewhere and will not be repeated here (2-9). The models herein were designed and calibrated not just to estimate overall P(DCS), but to also match the time intervals when symptom occurrence is actually observed.

The current model used for hyperbaric exposures without high oxygen (less than 1 atmosphere partial pressure) is called USN93 (6). It was originally calibrated in 1991 using 2,383 air and N_2-O_2 dives (3). Most of these dives were of short duration, lasting minutes to hours. However, 302 saturation dives with durations of several days were included, many of which were designed to simulate submarine rescue scenarios (2). Overall predictive ability of the model for saturation dives was good: 40.2 cases were predicted (95% confidence limits of 28 to 52) and 36.8 were observed (3). The fractional component of cases arises from assigning a value of 0.1 DCS cases to mild and/or fleeting symptoms, not deemed in need of recompression by the attending medical officer. There were 32 treated DCS (value 1.0) cases and 48 marginals for an overall incidence of 36.8/302 (12%). The inclusion and weighting of marginal, or mild, symptoms is of arguable merit in submarine rescue applications.

Following initial model calibration a prospective validation trial was conducted. The trial consisted of 717 experimental dives, emphasizing long and multilevel dives not well represented in the original collection of 2,383 dives. For this validation trial overall, 46 ± 10 DCS cases were predicted and 38 were observed. This constitutes an excellent agreement, considering the prediction was an extrapolation outside the calibration set. Subsequently, these 717 dives, another 165 well-documented saturation dives, and 57 no-decompression dives of 6-hour duration (16) were added to bring the new calibration base to 3,322 dives. In 1993 this database of collected exposures was used for model recalibration and the resulting final model was USN93. This model was then used to produce decompression tables and decompression computer algorithms (5,6). In its final form, USN93 was a good predictor of DCS in the 467 calibration saturation dives: 58.1 cases observed vs. 61.0 predicted (95% confidence limits of 47 to 75 cases). In the model's tuning of occurrence times, there was a noticeable trend to estimate late onset cases too early: of the 30.0 cases with symptom onset between 4 and 24 hours, only 20.0 were predicted to occur that late. Thus, it is reasonable to expect that predictions of symptom onset during a prolonged surface interval might be delayed even later than predicted.

USN93 assumes that only nitrogen gas contributes to DCS risk and treats oxygen gas as "DCS risk-free". However, USN93 does not perform well on predicting P(DCS) when high oxygen concentrations are breathed, underpredicting DCS occurrence by 60% (3,6). To improve model performance, two model variants (HIO2A and HIO2B) were developed to allow for specific oxygen effects (4,9). Variant HIO2B allows some of the inspired oxygen to act as an inert gas, which combines with nitrogen to produce a DCS risk. The other variant, HIO2A, allows high oxygen to slow nitrogen excretion from the body, an effect shown to occur in human laboratory studies (10). Both variants were calibrated on an enlarged data set containing the original 3,322 dives plus 586 dives that used oxygen during decompression (either in-water or dry) and an additional 427 surface decompression with oxygen dives. The high oxygen pressure (PO_2) segments in these latter two dive categories were in the range of 2.5 to 2.8 ATA.

The two oxygen model variants provided statistically important and near equivalent improvements over USN93 (6,9). They both predicted about 31 DCS cases (95% confidence limits of 22 to 41 cases), and 34.7 cases were observed in the 1,013 high oxygen calibration dives. Small differences in the risk predictions of the two oxygen variants are not important for the present application and both variants are used here. The model variants were optimized in part by adjusting an estimated parameter for the threshold in PO_2 below which oxygen does not contribute to risk. Since both models estimated this PO_2 threshold to be above 1 atmosphere (1.03 ± 0.2 for HIO2B and 1.69 ± 0.1 ATA for HIO2A), neither variant is required for normobaric oxygen use. The predictions given in this report for effectiveness of normobaric oxygen (i.e., near 100% but on the surface) use USN93.

SCENARIO ASSUMPTIONS

For DCS to be an issue, a decompression from some higher pressure must occur. In the disabled submarine (DISSUB) scenario, the primary assumption is that internal submarine atmospheric pressure is raised secondary to some untoward event. The many events that can raise the internal pressure are varied in their source: partial compartment flooding, discharge of high pressure oxygen or air banks (including salvage air), or use of the emergency air breathing systems are some examples. Despite these myriad scenarios, the net effect is an overpressurization of the breathing atmosphere. The amount of pressurization possible has been estimated to range over several atmospheres, with 5 ATA (132 fsw) as a practical upper bound (1).

The time for deployment of submarine rescue assets following notification of an accident is measured in days. Because humans reach a steady state equilibration with inspired inert gases in about two days, we assume that all survivors are "saturated". This assumption has no practical impact unless rescue occurs within about a day, in which case the predictions in this report will be slightly too high.

The gas mixture breathed by the survivors can vary over the full range of breathable atmospheres compatible with life, ranging from oxygen fractions as low as 9% at 1 atmosphere, to over 20% at several atmospheres (1). For purposes of establishing a decompression obligation due to time spent in the DISSUB atmosphere, we assume that only the nitrogen partial pressure is of concern. (We ignore the small effects of very high oxygen [above 1 ATA] and a suspected small effect of carbon dioxide on DCS etiology). This focus on nitrogen gas alone is called the "equivalent air assumption".

All results presented in this report are expressed in terms of air pressure found in the DISSUB. If the submarine atmosphere prior to rescue does not have an oxygen fraction of 21%, it is necessary to use the equivalent air depth. For example, at a depth of 90 fsw and an oxygen fraction of 16%, more nitrogen is present than air at 90 fsw. Simple arithmetic shows the equivalent air depth to be 98 fsw. Appendix 1 is provided for determination of the equivalent air depths over the plausible DISSUB rescue range, so that the calculation need not be made on site.

Other salient assumptions are related to the rescue mechanisms projected to be available. As the rescue begins, we assume the survivors will enter an air environment in the rescue vehicle where the pressure has been equalized to the DISSUB internal pressure. Oxygen may or may not be available on board the rescue vehicle. The rescue vehicle must transit to a host location where decompression of the survivors can occur. Based on assumed hardware limitations, we assume a decompression rate of 5 feet per minute (fpm) for all scenarios. Modest deviations from that rate do not alter the results in any important way.

Our final assumptions relate to the acceptable level of DCS occurrence for DISSUB rescue. What is an acceptable DCS rate? No simple answer can be given. Certainly, recovery of live submarine crewmen with no permanent disability is the preferred outcome. Some cases of DCS, especially if relatively mild and responsive to recompression treatment, would also be an acceptable outcome under the circumstances. Acceptable DCS risk for U.S. Navy divers as an occupational group was set at 2.3 to 5.0% for routine diving and up to 10% for exceptional exposures (6). Occupational and exposure differences between divers and submarine sinking survivors will not be discussed further. For the saturation dive calibration data (467 dives with 12.4% DCS observed), marginal DCS symptoms not deemed necessary to treat were observed about as often as more severe DCS (2). Even the cases treated were generally slow in onset, with mild to moderate knee pain. Overall, we feel that a rescue commander who could achieve a DCS risk less than 15%-20%, and provide follow-up medical and recompression care, would have a good chance of avoiding permanent disability to a majority of the survivors.

The following present predicted DCS risk estimates from application of USN93 and variants for 6 potential rescue scenarios:

(i) **No-Stop**
Directly surfacing to 1 ATA without oxygen breathing or recompression support

(ii) **Slow-Air**
Slowed decompression while breathing air

(iii) **Direct Sur-D**
Directly surfacing then "full" recompression after a surface interval at 1 ATA

(iv) **O_2 -DSRV**
Oxygen breathing during decompression in a rescue vehicle

(v) **Preventive Treatment**
Prophylactic treatment after a surface interval with USN Treatment Tables

(vi) **Oxygen Only**
Oxygen breathing at 1 ATA on the recovery platform

ESTIMATED RISKS

(i) No-Stop

(Directly surfacing to 1 ATA without oxygen breathing or recompression support)

This scenario represents a situation with no support available to the survivors. Survivors are required to reach the surface without decompression stops at a rate of 5 fsw/min and without recompression facilities available. The expected decompression incidence rises with saturation pressure, as shown in Figure 1. For example, at a saturation equivalent air depth of 35 fsw, USN93 predicts P(DCS) to be about 20%. Furthermore, from a depth of 70 fsw, the chance of a survivor suffering DCS is "only" about 50:50. Applying the model to the assumed maximum saturation pressure of 5 ATA (132 fsw internal pressure), the DCS risk rises to a predicted maximum of 80%. Thus, the model estimates support rescue attempts at the expected maximum pressure even with no decompression support available.

Direct human data is available to support the plausibility of these predictions at depths shallower than 35 fsw. At greater depths and hence higher incidence, Figure 1 should be considered highly theoretical, as a model extrapolation. Near-fatal DCS in rats demonstrates a dose-response curve that approximates Figure 1, but at a much greater depth (12). Humans have undergone a sudden decompression of over 60 fsw after air saturation with symptoms of knee pain emerging over several hours (13). However, those observations involved testing upward excursion limits (e.g., movement from saturation at 132 fsw to 55-70 fsw) which are considered to be of lower risk than directly surfacing from saturation depth.

(ii) Slow-Air

(Slowed decompression while breathing air)

This scenario presumes that once the rescue vehicle returns to the host platform, an immediate decompression of survivors might not be necessary. Time could be available if no return trips to the disabled submarine are necessary, and conditions are otherwise stable. With sufficient life support on board the rescue vehicle, a slow saturation decompression could be accomplished, much like following an operational or scientific air saturation dive. However, because such conservative saturation decompressions can last for 2-3 days, only part of that conservatism might be warranted. Appendix 2 provides several sets of "time constrained" decompression tables. These tables span the anticipated range of starting pressures of 33 to 132 fsw and total time constraints in 4- to 8-hour increments. They are presented as decompression schedules with stop times at each foot of depth during the decompression, and assume a travel rate of 5 fsw/min between stops. Each table has been optimized using model USN93 to provide the minimum risk achievable from any decompression path within the given constraints. A plot showing the time-risk tradeoff is provided in Figure 2. The amount of decompression time required for adequate safety increases rapidly with saturation depth. Despite the long decompression times for the majority of these scenarios, a considerable risk reduction can be achieved with a modest amount of staged decompression. For example, even 15 h of decompression from 66 fsw provides a 50% decrease in estimated DCS risk. Again, human data are available to support risk estimates below a P(DCS) of about 20%.

More than 300 man-dives for experimental air saturation decompression trials have been recorded with no permanent injury (2). From a depth of 132 fsw, a total decompression period of about 2 days seems adequate for divers. U.S. Navy Treatment Table 7 was designed to provide safe return from 60 fsw air saturation and requires a decompression period of over 36 h (17). At depths deeper than 60 fsw, the tables in Appendix 2 represent progressively greater extrapolation using USN93. Among the air saturation decompression experiments we have examined, few seemed to provide less than 5% DCS risk and 10% is not uncommon. These experimental saturation dives are dominated by minor symptoms of DCS which may be readily accepted during a real DISSUB rescue. Within the uncertainty of the model, strict adherence to the prescribed decompression stop plan of one foot increments is unwarranted, and most foreseeable approximations to the table should not affect the outcome (e.g., taking the combined stop times of 3 depths at the middle of the 3 depths).

The time-constrained tables of Appendix 2 are also available in a PC-based software program, where the derived schedule is selected and presented for any input combination of starting depth and total time allowed for the decompression. Appendix 3 provides a brief guide for the use of this software.

(iii) Direct Sur-D

(Surfacing, then "full" recompression after a surface interval at 1 ATA)

In this scenario, it is conceivable that recompression treatment facilities are available, but not directly connectable to the rescue vehicle. It may be necessary to decompress the survivors to 1 ATA at the maximum rate, then transport them to another location where "complete" recompression treatment is available. We do not define "complete", except to truncate our calculation of DCS risk at that point in time, assuming that the full treatment will prevent any symptom development that had not occurred during the surface interval period. The fact that USN93 was calibrated using known symptom onset intervals (6,8) allows us to examine the time course of risk accumulation during surface interval. Figure 3A (and 3B on a smaller scale) shows the temporal development of risk after decompression at 5 fpm. The benefit of treatment provided even after a delay of hours can be readily seen. For example, Fig. 1 shows that the risk of directly surfacing from 66 fsw is about 45%, and Figs. 3A and 3B show that recompression treatment given after 2 h lowers the risk to 16%. As the surface interval increases, the benefit of full recompression diminishes due to the magnitude of risk accumulation.

Over nearly the entire pressure range, about half of the total risk is incurred within 3 h on the surface. Even from 132 fsw saturation, delay of an hour would keep the extrapolated risk estimate below the 20% nominal DCS bound seen in human experiments. No direct data is available from those depths, but DCS symptoms were rare and frequently mild in earlier DISSUB experiments that were in 7-30 min duration at depths $\leq$ 75 fsw (14). Edel, however, reported a case he considered life-threatening after about 19 min on the surface from a saturated depth of 42 fsw (11).

(iv) O_2 -DSRV

(Oxygen breathing during decompression in a rescue vehicle)

A proposal has been made that rescue vehicles be equipped to provide oxygen to survivors while in transit. Risk calculations can be made to correspond to actual rescue systems when fully specified, but some idea of the possible efficacy of oxygen breathing can be obtained using existing knowledge. We assume that the rescue vehicle has a limited oxygen supply, and as an example, that rescuees from deeper than 60 fsw will decompress to 60 fsw and hold there while breathing oxygen. Rescuees from shallower depths can breathe oxygen at their initial pressure. Figure 4 shows the possible risk decrease for each "standard oxygen period" (25 min on 100% O_2

followed by 5 min breathing vehicle air). Predictions for both oxygen model variants, HIO2A and HIO2B, are shown. Both model variants have been successful in fitting to dives which used oxygen during decompression, either in-water or dry, albeit for non-saturation exposures (9). [Note: Risk predictions for dives without oxygen breathing periods using these O_2 models may not match those in earlier figures where the USN93 model was used. However, we do not expect these model differences to impact on operational decisions within our current ability to make such predictions.]

Figure 4 can be used directly in a time-risk tradeoff, since each two "standard periods" is equivalent to one hour of decompression time. Short oxygen usage appears to provide little advantage: that is, one or two periods decrease risk only marginally. Four to six hours of oxygen breathing (8 to 12 O_2 periods) cuts the estimated risk to about one-half. For the deepest saturation exposures, over 20 O_2 periods are needed to reduce predicted DCS risk to 20%. Further, the benefit due to oxygen breathing can be calculated by comparing Figures 2 and 4. For example, the predicted risk of a slowed decompression over 6 h from 66 fsw is 34% as seen in Fig. 2. However, if oxygen is given at 60 fsw for that time period (12 O_2 periods), the risk drops to 13%-16% (HIO2A and HIO2B models, Fig. 4).

Essentially no direct human data has been found to support these curves. At the HYDROLAB undersea habitat, standard air decompression had a very low incidence of DCS, but humans were noted as "feeling much better" if the decompression were preceded with 2 h of oxygen breathing (15).

(v) Preventive Treatment

(Prophylactic treatment after surface interval with USN Treatment Tables)

Some scenarios would have recompression treatment facilities within transport range of the rescue vehicle, but would not have sufficient capacity to allow a "complete" recompression treatment regardless of time required. In that case, resource management requires the tradeoff of treatment efficacy against time consumed. Figures 5 and 6 show the risk incurred by survivors who first decompress at 5 fpm inside the vehicle, then get a limited treatment after a specified surface interval. The examples chosen are a standard U.S. Navy Treatment Table 6 (TT6; about 5 hours duration) in Fig. 5, and a maximally extended TT6 (about 8 h duration with 2 additional periods at 60 fsw and 2 additional oxygen periods at 30 fsw) in Fig. 6. The risk predictions of models HIO2A and HIO2B are shown in long dashed and solid lines, respectively.

Use of the prophylactic treatments are predicted to be quite beneficial. For example, the predicted risk of directly surfacing from 66 fsw drops from 45% (Fig. 1) to the 16-17% range (Fig. 5) if a standard USN TT6 is given as soon as the rescuees surface. If a TT6 with maximum extensions is given, the risk further drops to the 4-5% range (Fig. 6.). We have not attempted to devise an "optimal" oxygen treatment with time constraints in favor of applying the well known standard, TT6. To achieve risks below the 20% nominal diving level, only the regular TT6 is needed if saturation depth was less than about 70 fsw. From a 132-fsw saturation, however, even an immediate and extended treatment table leaves a 35% risk. Delay in starting the treatment table adds a modest amount of risk over the first few hours. Treatment delays beyond 4-6 h will make a standard table nearly ineffective, but the extended table will still prevent about half the total cases from 100 fsw or shallower if instituted within 3 h of surfacing.

(vi) Oxygen Only

(Oxygen breathing at one atmosphere on the recovery platform)

This scenario assumes that breathable oxygen might be available on the host platform, albeit at atmospheric pressure, even in the absence of recompression facilities. Figure 7 shows the USN93 estimate of the efficacy of breathing oxygen on the surface for 24 h following rescue. It is assumed that breathing is continuous at an effective delivered oxygen concentration of 98%. Comparison to Fig. 1 shows the advantage of oxygen breathing. The DCS risk of 45% from the previous example drops to 28% if oxygen is breathed on the surface without delay. A 50% reduction in total cases appears possible only for saturation depths less than 60 fsw. Some protection is afforded from deeper depths, but most predicted DCS cases will still occur. Delays of more than 2-4 h in oxygen delivery will reduce the benefit to one of mainly psychological importance, which is not without merit.

DISCUSSION

This report contains predictions of DCS risk far outside the range of possible verification. It was prepared only because no better source of planning information for the submarine rescue mission is available to date.

For each set of predictions, the applicable data were mentioned, even if quite sparse and qualitative. Quantitative predictions were provided, all based on probabilistic models of DCS occurrence. The estimates appear consistent within the limited body of data. Extrapolation into data-free regimes suffers from lack of a complete human DCS dose-response curve, and from reliance on calibration data dominated by less serious manifestations of human DCS. High-oxygen models are showing promise in improving DCS prediction. Any limitations from these extrapolations and new models can be reduced with further research.

Two overall observations seem quite important for those planning for submarine rescue missions. One is that many individuals are predicted to be free of DCS after a very severe decompression with little or no immediate treatment. The second is that several hours of high pressure oxygen breathing during or soon after the decompression can markedly reduce expected casualties.

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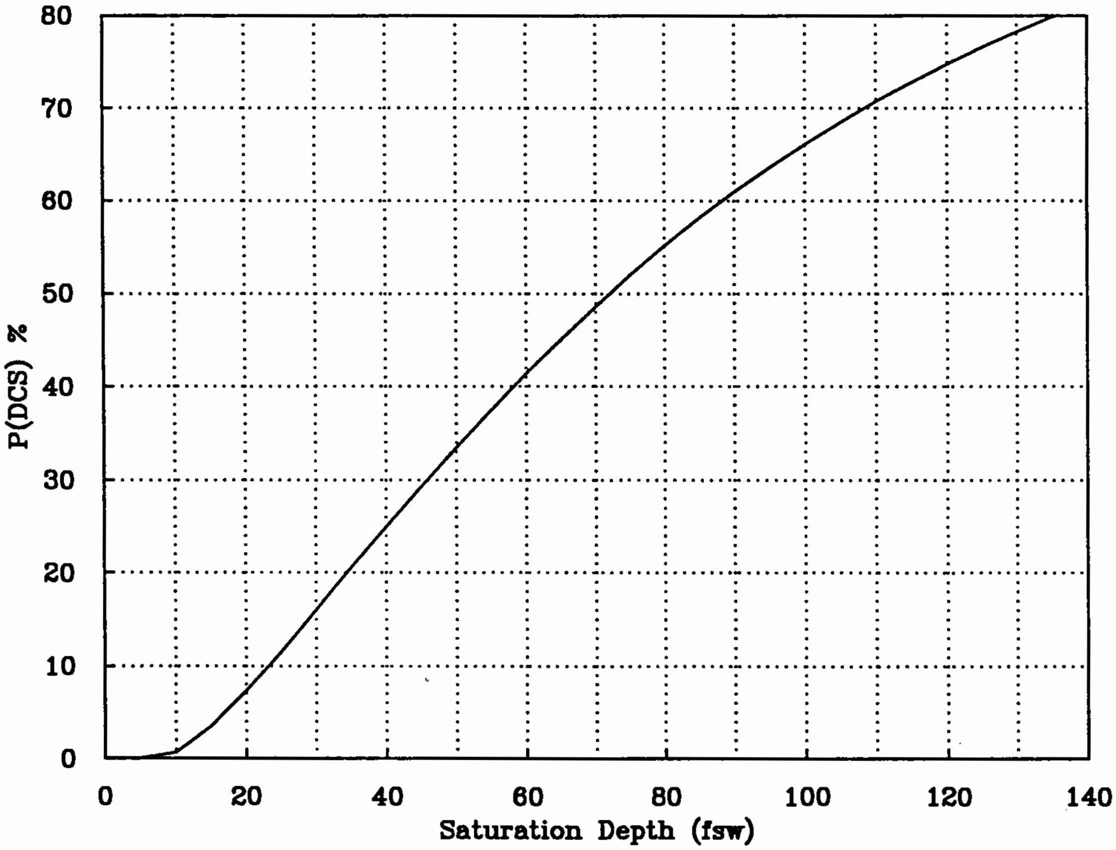


Figure 1. USN93 predicted risk of DCS with direct surfacing from saturation depth (ascent rate 5 fpm)
(e.g., direct ascent from 40 fsw saturation = 25%)

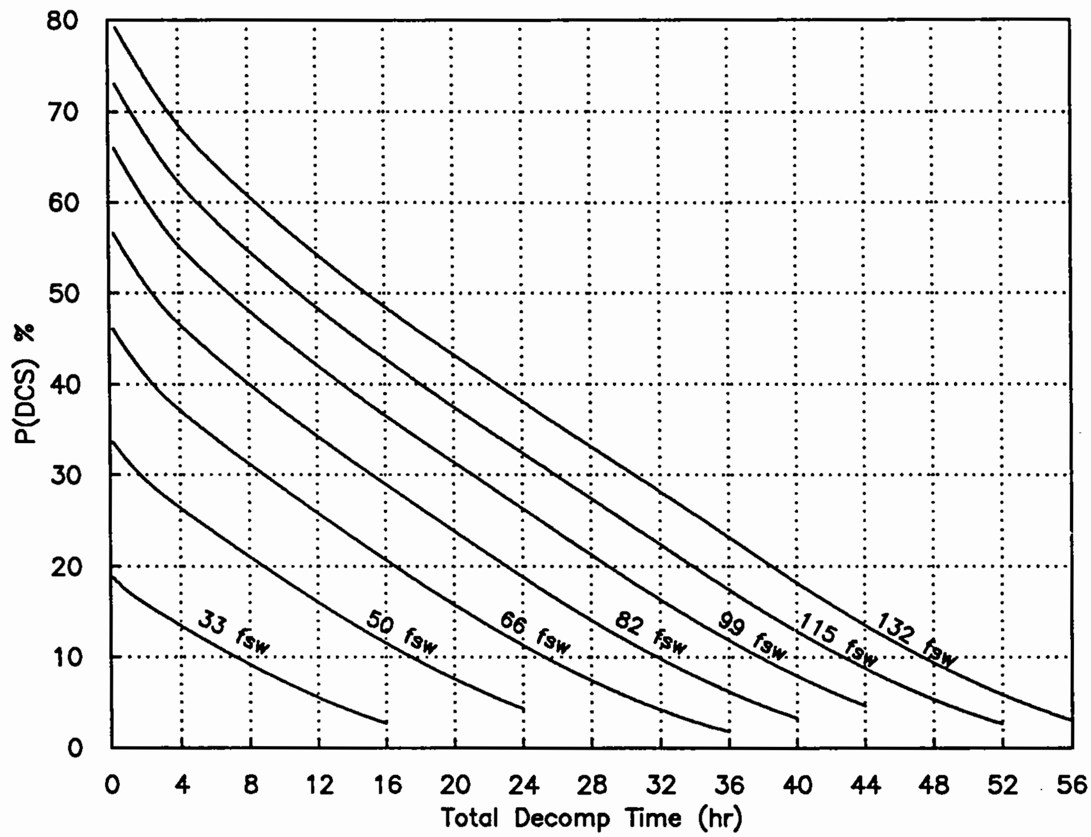


Figure 2. Time constrained decompression: Effect of total decompression time on USN93 risk prediction

(e.g., decompression from saturation at 50 fsw with a 6 hour time constraint = 23%)

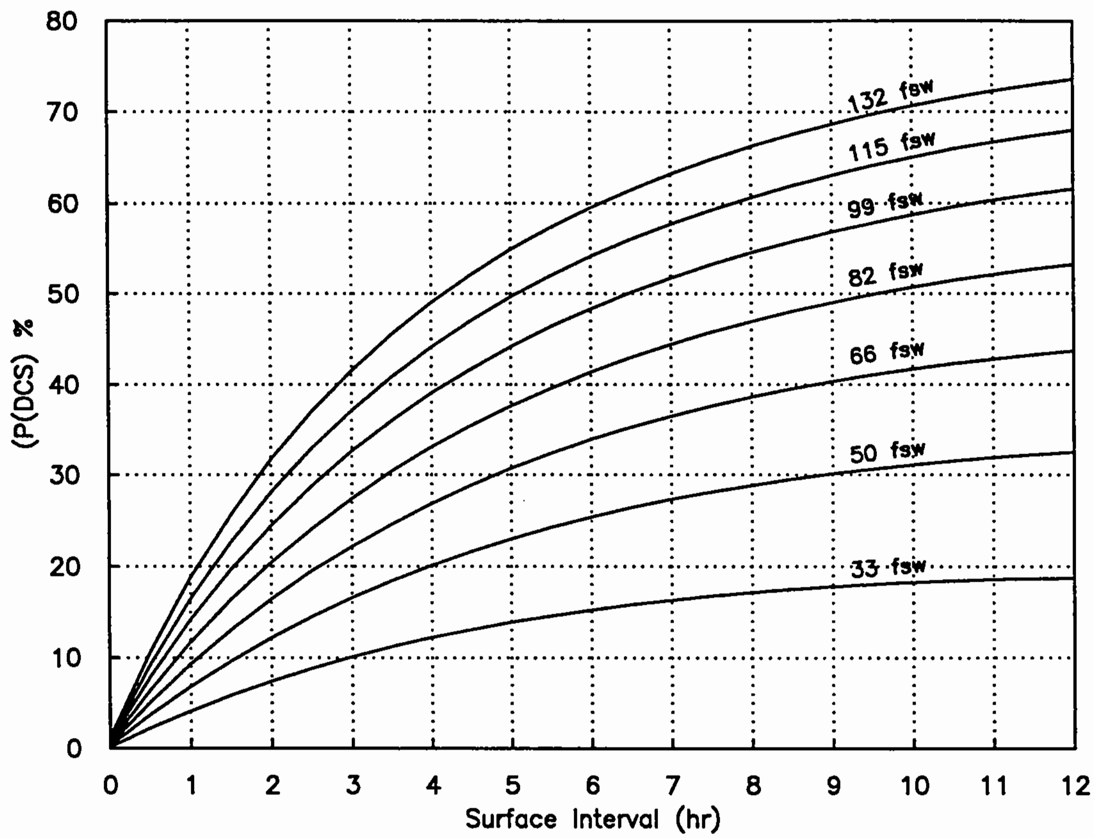


Figure 3A. USN93 prediction of risk during surface interval after direct surfacing from saturation.
(e.g., 9 hours after direct surfacing from 50 fsw saturation = 30%)

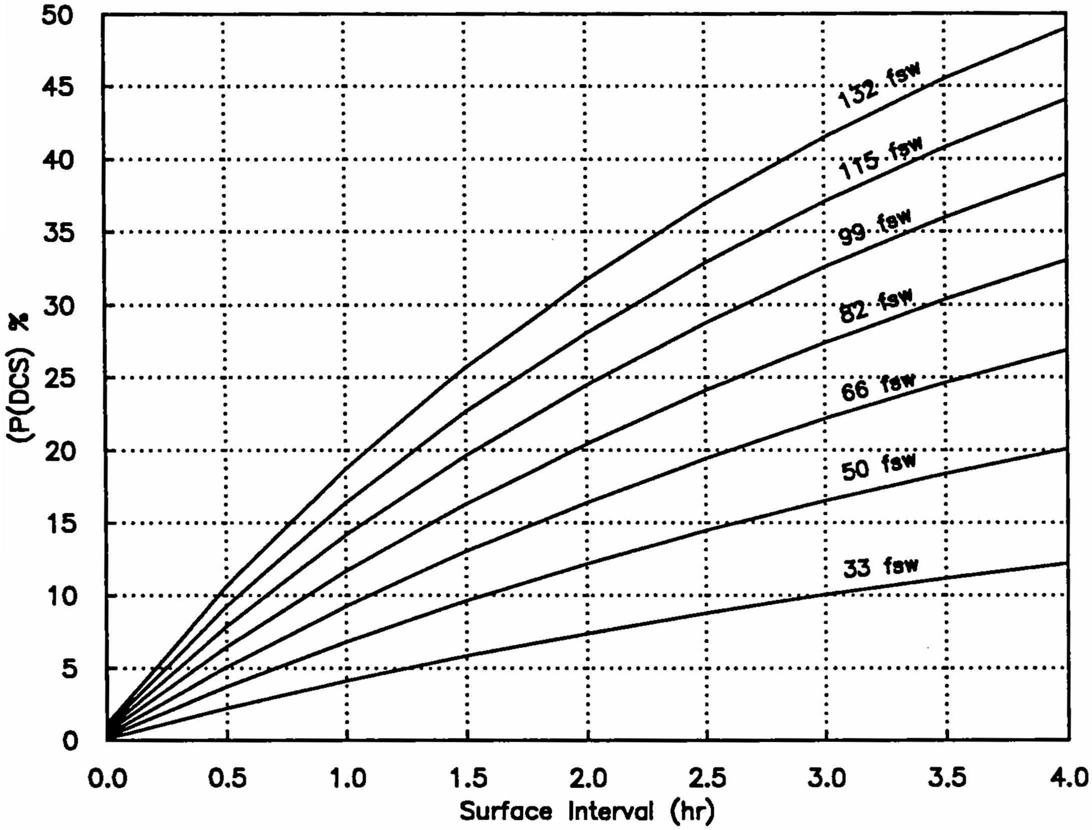


Figure 3B. USN93 prediction of risk during surface interval after direct surfacing from saturation.

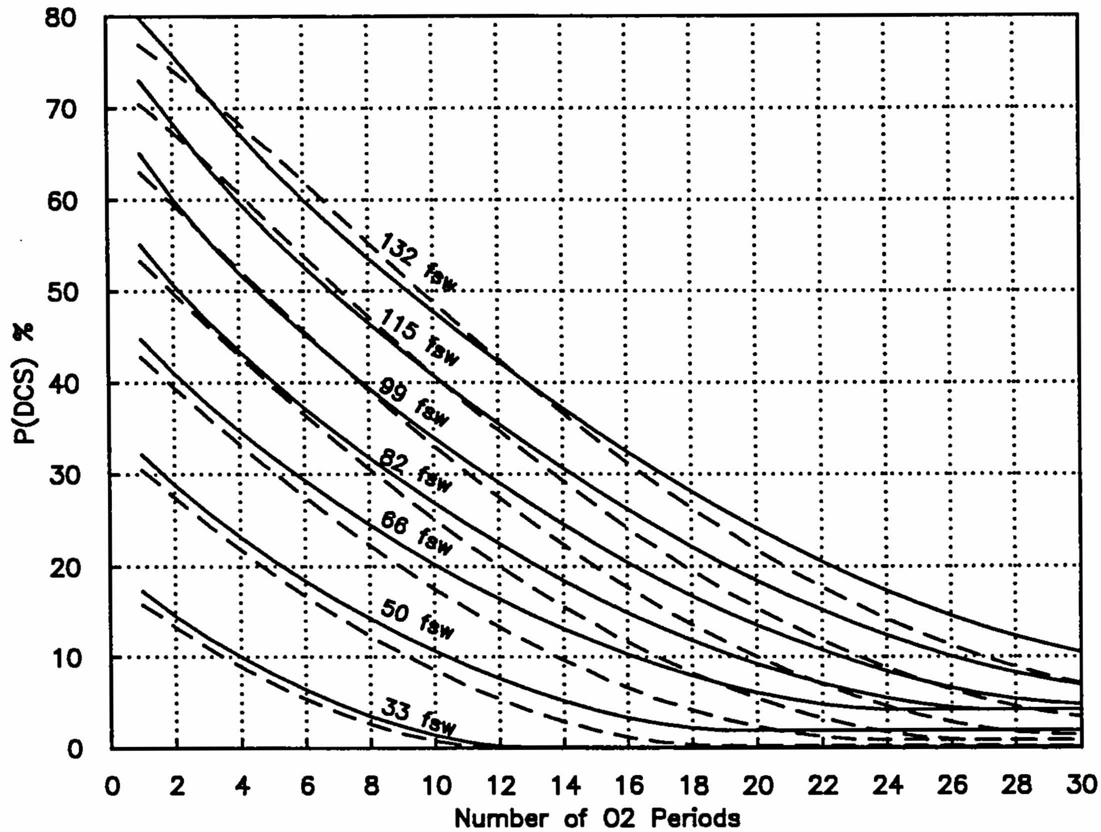


Figure 4. Effect of oxygen breathing during decompression. Oxygen at 60 fsw or shallower (30 min O_2 period = 25 min O_2 + 5 min air) HIO2A (solid) and HIO2B (dashed) DSC risk predictions.

(e.g., following saturation at 82 fsw, 8 oxygen periods at 60 fsw ≅ 31%; compare to same total decompression [4 hours] in Figure 2: ≅ 47%)

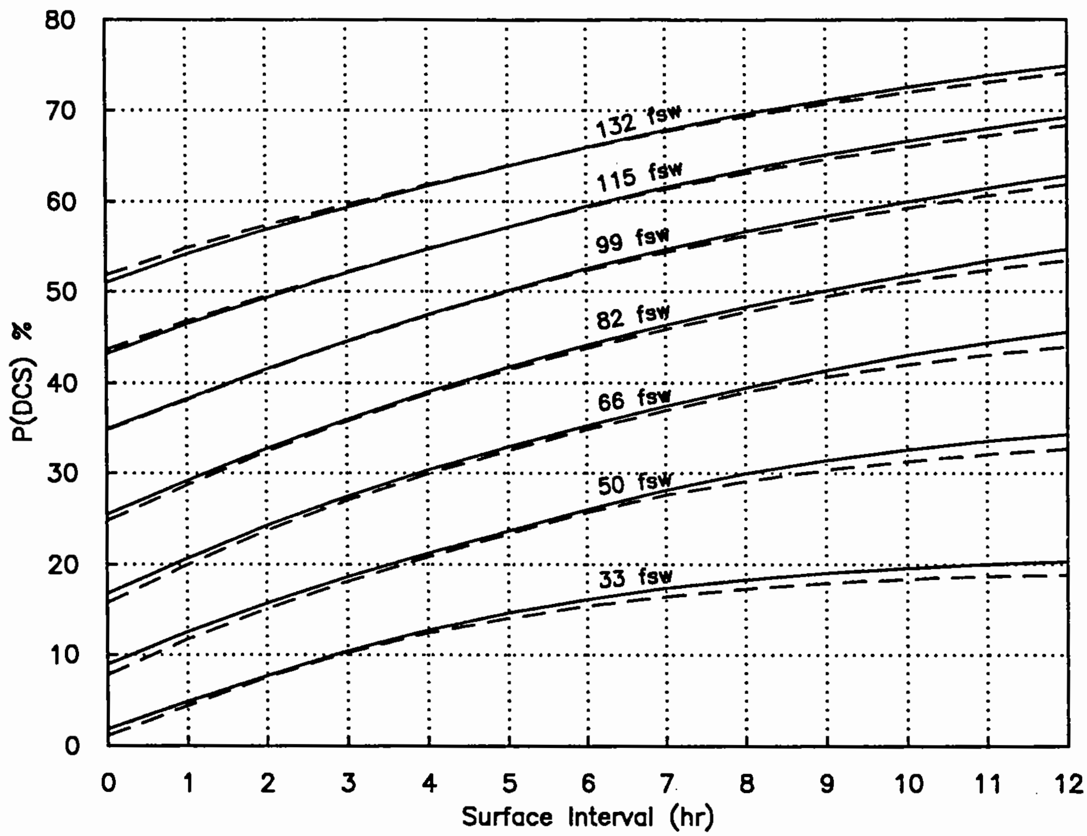


Figure 5. Use of TT6 after direct surfacing from saturation. Effect of surface interval. HIO2A (solid) and HIO2B (dashed) DCS risk predictions
(e.g., a delay of 5 hours in use of TT6 following direct ascent from saturation at 82 fsw increases DCS risk from ≅ 25% to ≅ 41%)

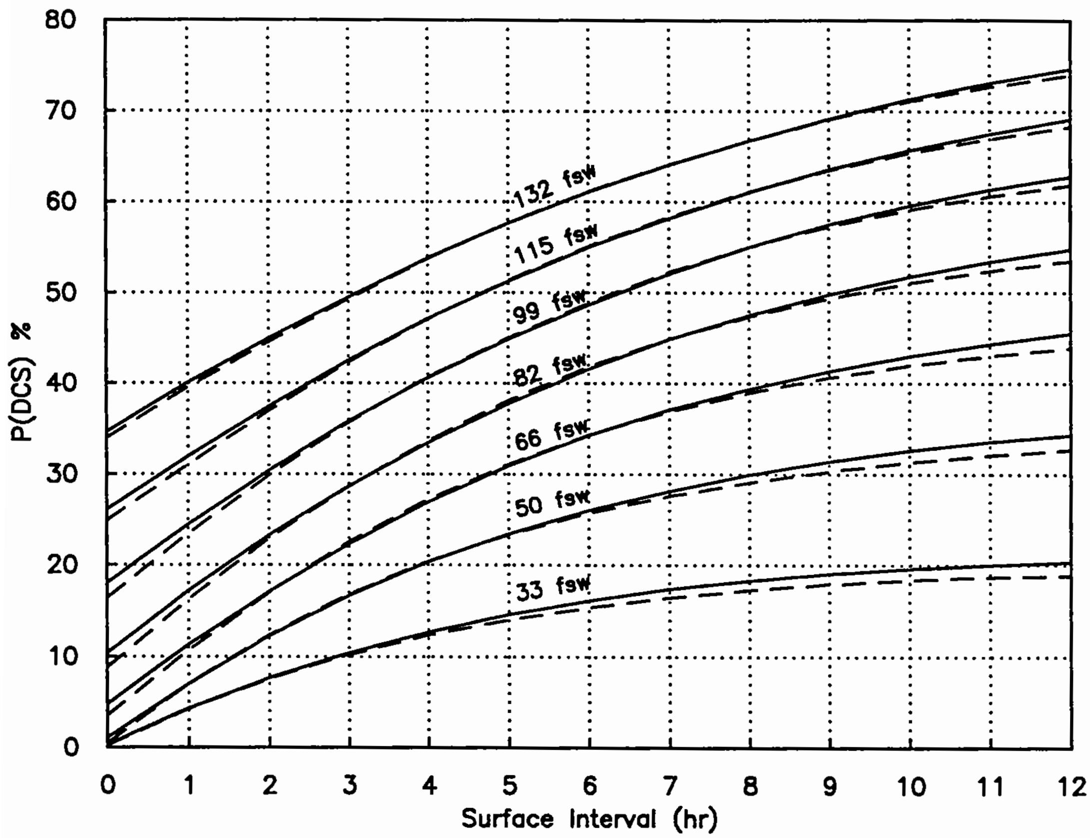


Figure 6. Use of TT6 with maximum extensions (2 + 2). Effect of surface interval HIO2A (solid) and HIO2B (dashed) DCS risk predictions **(e.g., a delay of 5 hours in use of TT6 following direct ascent from saturation at 82 fsw increases DCS risk from ≅ 10% to ≅ 38%)**

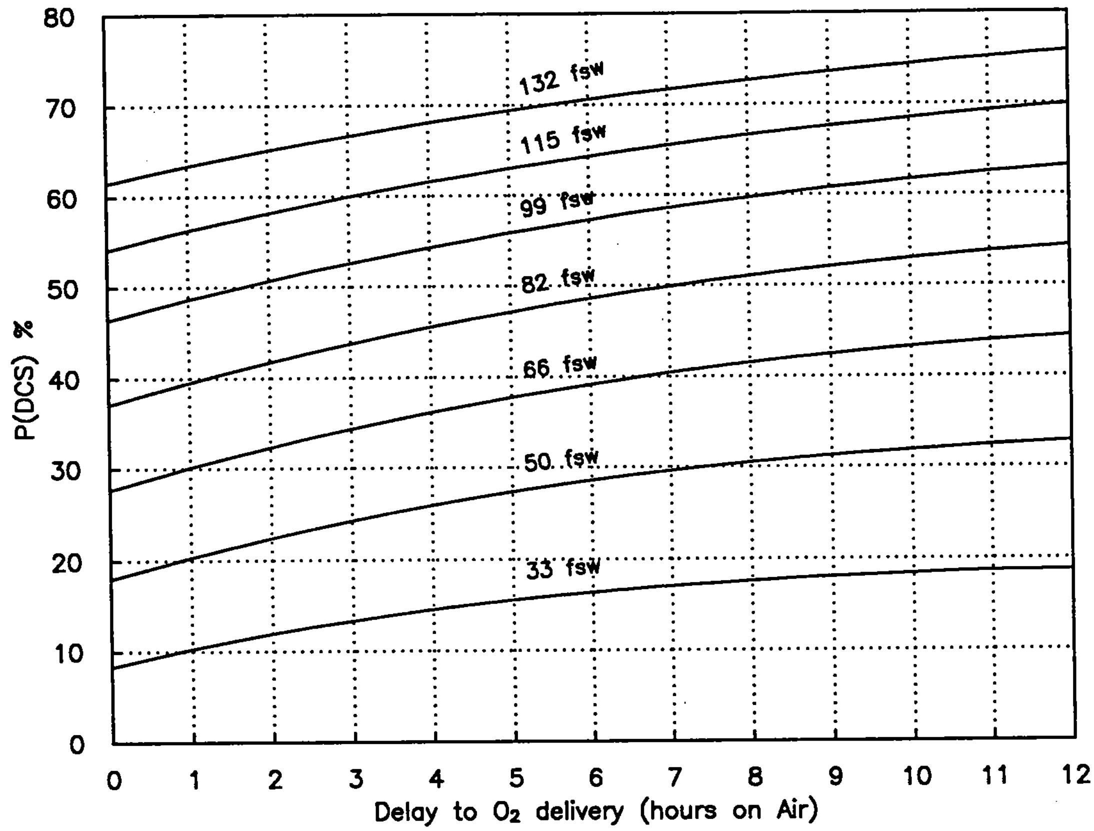


Figure 7. Use of surface oxygen (24 hours of 100% oxygen at 1 ATA). Effect of delay to oxygen delivery. USN93 DCS risk prediction.

(e.g., a six hour delay in use of surface oxygen following direct ascent from saturation at 50 fsw increases predicted risk from ≅ 18% to ≅ 29%).

Appendix 1: Table of Equivalent Air Depths

Example: If submarine internal pressure is 60 fsw (first column) and oxygen content of submarine atmosphere is 16%, the equivalent air depth will be 66 fsw.

Depth (fsw)	Oxygen (%)					
	10	13	16	19	22	25
20	27	25	23	21	19	17
25	33	31	29	26	24	22
30	39	36	34	32	29	27
35	44	42	39	37	34	32
40	50	47	45	42	39	36
45	56	53	50	47	44	41
50	62	58	55	52	49	46
55	67	64	61	57	54	51
60	73	69	66	62	59	55
65	79	75	71	67	64	60
70	84	80	77	73	69	65
75	90	86	82	78	74	70
80	96	91	87	83	79	74
85	101	97	92	88	84	79
90	107	102	98	93	88	84
95	113	108	103	98	93	89
100	119	113	108	103	98	93
105	124	119	114	108	103	98
110	130	124	119	114	108	103
115	136	130	124	119	113	108
120	141	135	130	124	118	112
125	147	141	135	129	123	117
130	153	147	140	134	128	122
135	158	152	146	139	133	126
140	164	158	151	144	138	131

Appendix 2: Time Constrained Tables

Printed tables for depths covering the anticipated starting pressures of 2-5 ATA are provided below. Total decompression times (TDT) are constrained in 4 to 8 hour increments. Risk of DCS, or P(DCS), is shown for each time-constrained table. The first column shows the stop depth. Each pair of columns following the stop depth consists of a decompression schedule for the corresponding TDT. The first column within each schedule pair contains the stop time (not including travel time) and the second column keeps track of elapsed time since beginning decompression. For example, the decompression schedule from 33 fsw with TDT of 16 hours requires a first stop of 5 minutes at 21 fsw. It will take 2 min to get to the first stop at the rate of 5 fpm, thus 7 minutes will have elapsed before leaving that stop. Since the 6 and 12-hour schedules do not require the 21 fsw stop their elapsed time will only be the 2-minute transit time. Total stop time (TST) of each schedule is shown at the bottom of the schedules.

Saturation Depth 33.0 (fsw)
Travel rate 5.0 (fsw/min)
Elapsed Time (Elps Time) until leaving that stop depth

TDT	6:00		12:00		16:00	
P(DCS)	---11.2---		--- 5.5---		--- 2.7---	
Stop Depth (fsw)	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM
21	0	0:02	0	0:02	5	0:07
20	30	0:33	45	0:48	45	0:53
19	50	1:23	50	1:38	55	1:48
18	55	2:18	55	2:33	55	2:43
17	50	3:08	55	3:28	55	3:38
16	55	4:03	55	4:23	55	4:33
15	55	4:59	60	5:24	60	5:34
14	45	5:44	60	6:24	60	6:34
13	5	5:49	60	7:24	60	7:34
12	5	5:54	60	8:24	65	8:39
11	5	5:59	65	9:29	65	9:44
10	0	5:60	65	10:35	65	10:50
9	0	5:60	65	11:40	70	11:60
8	0	6:00	20	12:00	70	13:10
7	0	6:00	0	12:00	75	14:25
6	0	6:00	0	12:00	70	15:35
5	0	6:01	0	12:01	25	16:01
0	0	6:02	0	12:02	0	16:02
TST	355		715		955	

Saturation Depth 50.0 (fsw)
Travel rate 5.0 (fsw/min)
Elapsed Time (Elps Time) until leaving that stop depth

TDT	6:00		12:00		18:00		24:00	
P(DCS)	---23.6---		---16.1---		--- 9.5---		--- 4.3---	
Stop Depth (fsw)	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM
34	0	0:03	0	0:03	10	0:13	15	0:18
33	15	0:18	35	0:38	35	0:48	40	0:58
32	10	0:29	40	1:19	40	1:29	40	1:39
31	10	0:39	40	1:59	45	2:14	45	2:24
30	10	0:49	40	2:39	40	2:54	40	3:04
29	25	1:14	45	3:24	45	3:39	45	3:49
28	35	1:49	40	4:04	40	4:19	45	4:34
27	30	2:20	45	4:50	45	5:05	45	5:20
26	30	2:50	45	5:35	45	5:50	45	6:05
25	30	3:20	45	6:20	45	6:35	45	6:50
24	25	3:45	45	7:05	50	7:25	50	7:40
23	20	4:05	45	7:50	45	8:10	50	8:30
22	20	4:26	50	8:41	50	9:01	50	9:21
21	15	4:41	50	9:31	50	9:51	50	10:11
20	15	4:56	45	10:16	50	10:41	50	11:01
19	10	5:06	35	10:51	50	11:31	55	11:56
18	10	5:16	15	11:06	55	12:26	55	12:51
17	10	5:27	15	11:22	55	13:22	55	13:47
16	10	5:37	15	11:37	55	14:17	55	14:42
15	5	5:42	5	11:42	55	15:12	60	15:42
14	5	5:47	5	11:47	55	16:07	60	16:42
13	5	5:52	5	11:52	60	17:07	60	17:42
12	0	5:53	0	11:53	45	17:53	60	18:43
11	5	5:58	5	11:58	5	17:58	65	19:48
10	0	5:58	0	11:58	0	17:58	65	20:53
9	0	5:58	0	11:58	0	17:58	70	22:03
8	0	5:58	0	11:58	0	17:58	70	23:13
7	0	5:59	0	11:59	0	17:59	45	23:59
0	0	6:00	0	12:00	0	18:00	0	24:00
TST	350		710		1070		1430	

Saturation Depth 66.0 (fsw)
Travel rate 5.0 (fsw/min)
Elapsed Time (Elps Time) until leaving that stop depth

TDT	6:00		12:00		18:00		24:00		28:00		36:00	
P(DCS)	---34.1---		---25.9---		---18.2---		---11.3---		--- 7.4---		--- 1.8---	
Stop Depth (fsw)	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM
47	0	0:04	0	0:04	0	0:04	0	0:04	0	0:04	5	0:09
46	5	0:09	5	0:09	15	0:19	25	0:29	25	0:29	30	0:39
45	0	0:09	10	0:19	30	0:49	30	0:59	35	1:04	35	1:14
44	5	0:14	5	0:24	35	1:24	35	1:34	35	1:39	35	1:49
43	5	0:20	10	0:35	35	1:60	35	2:10	35	2:15	35	2:25
42	5	0:25	5	0:40	35	2:35	35	2:45	35	2:50	40	3:05
41	5	0:30	25	1:05	35	3:10	35	3:20	35	3:25	35	3:40
40	5	0:35	30	1:35	35	3:45	35	3:55	35	4:00	35	4:15
39	5	0:40	30	2:05	35	4:20	40	4:35	40	4:40	40	4:55
38	5	0:46	30	2:36	35	4:56	35	5:11	35	5:16	35	5:31
37	10	0:56	30	3:06	40	5:36	40	5:51	40	5:56	40	6:11
36	5	1:01	30	3:36	35	6:11	35	6:26	35	6:31	40	6:51
35	10	1:11	30	4:06	40	6:51	40	7:06	40	7:11	40	7:31
34	10	1:21	35	4:41	35	7:26	40	7:46	40	7:51	40	8:11
33	10	1:32	30	5:12	40	8:07	40	8:27	40	8:32	45	8:57
32	25	1:57	30	5:42	40	8:47	40	9:07	40	9:12	40	9:37
31	25	2:22	35	6:17	40	9:27	40	9:47	45	9:57	45	10:22
30	25	2:47	35	6:52	40	10:07	40	10:27	40	10:37	40	11:02
29	20	3:07	30	7:22	45	10:52	45	11:12	45	11:22	45	11:47
28	20	3:28	30	7:53	40	11:33	40	11:53	45	12:08	45	12:33
27	20	3:48	30	8:23	45	12:18	45	12:38	45	12:53	45	13:18
26	15	4:03	30	8:53	45	13:03	45	13:23	45	13:38	50	14:08
25	15	4:18	25	9:18	45	13:48	45	14:08	45	14:23	45	14:53

Saturation Depth 66.0 fsw (continued)

TDT	6:00		12:00		18:00		24:00		28:00		36:00	
P(DCS)	---34.1---		---25.9---		---18.2---		---11.3---		--- 7.4---		--- 1.8---	
Stop Depth (fsw)	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM
24	15	4:33	25	9:43	45	14:33	50	14:58	50	15:13	50	15:43
23	15	4:49	20	10:04	45	15:19	45	15:44	45	15:59	50	16:34
22	10	4:59	20	10:24	35	15:54	50	16:34	50	16:49	50	17:24
21	10	5:09	15	10:39	20	16:14	50	17:24	50	17:39	50	18:14
20	10	5:19	15	10:54	20	16:34	50	18:14	50	18:29	55	19:09
19	5	5:24	15	11:09	15	16:49	50	19:04	55	19:24	55	20:04
18	10	5:35	10	11:20	15	17:05	50	19:55	55	20:20	55	20:60
17	5	5:40	15	11:35	15	17:20	55	20:50	55	21:15	55	21:55
16	5	5:45	5	11:40	10	17:30	55	21:45	55	22:10	60	22:55
15	5	5:50	5	11:45	10	17:40	55	22:40	55	23:05	60	23:55
14	0	5:50	0	11:45	0	17:40	55	23:35	60	24:05	60	24:55
13	5	5:56	5	11:51	5	17:46	10	23:46	60	25:06	60	25:56
12	0	5:56	5	11:56	5	17:51	5	23:51	60	26:06	65	27:01
11	0	5:56	0	11:56	0	17:51	0	23:51	60	27:06	65	28:06
10	0	5:56	0	11:56	5	17:56	5	23:56	50	27:56	65	29:11
9	0	5:56	0	11:56	0	17:56	0	23:56	0	27:56	70	30:21
8	0	5:57	0	11:57	0	17:57	0	23:57	0	27:57	70	31:32
7	0	5:57	0	11:57	0	17:57	0	23:57	0	27:57	75	32:47
6	0	5:57	0	11:57	0	17:57	0	23:57	0	27:57	75	34:02
5	0	5:57	0	11:57	0	17:57	0	23:57	0	27:57	80	35:22
4	0	5:57	0	11:57	0	17:57	0	23:57	0	27:57	35	35:57
0	0	5:58	0	11:58	0	17:58	0	23:58	0	27:58	0	35:58
TST	345		705		1065		1425		1665		2145	

Saturation Depth 82.0 (fsw)
Travel rate 5.0 (fsw/min)
Elapsed Time (Elps Time) until leaving that stop depth

TDT	12:00		18:00		24:00		30:00		36:00		40:00	
P(DCS)	---34.3---		---26.4---		---18.8---		---11.8---		--- 6.1---		--- 3.2---	
Stop Depth (fsw)	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM
59	0	0:05	0	0:05	5	0:10	10	0:15	10	0:15	15	0:20
58	0	0:05	10	0:15	20	0:30	25	0:40	30	0:45	30	0:50
57	5	0:10	5	0:20	30	1:00	30	1:10	30	1:15	30	1:20
56	5	0:15	5	0:25	30	1:30	30	1:40	30	1:45	30	1:50
55	5	0:20	10	0:35	30	2:00	30	2:10	30	2:15	30	2:20
54	5	0:26	20	0:56	30	2:31	30	2:41	30	2:46	30	2:51
53	0	0:26	25	1:21	30	3:01	30	3:11	30	3:16	30	3:21
52	10	0:36	30	1:51	30	3:31	30	3:41	30	3:46	30	3:51
51	5	0:41	25	2:16	30	4:01	30	4:11	30	4:16	30	4:21
50	5	0:46	25	2:41	30	4:31	30	4:41	30	4:46	30	4:51
49	10	0:57	30	3:12	35	5:07	35	5:17	35	5:22	35	5:27
48	5	1:02	25	3:37	30	5:37	30	5:47	30	5:52	35	6:02
47	15	1:17	25	4:02	30	6:07	30	6:17	30	6:22	30	6:32
46	25	1:42	30	4:32	35	6:42	35	6:52	35	6:57	35	7:07
45	20	2:02	25	4:57	30	7:12	30	7:22	35	7:32	35	7:42
44	25	2:28	30	5:28	35	7:48	35	7:58	35	8:08	35	8:18
43	25	2:53	30	5:58	35	8:23	35	8:33	35	8:43	35	8:53
42	20	3:13	30	6:28	35	8:58	35	9:08	35	9:18	35	9:28
41	25	3:38	30	6:58	35	9:33	35	9:43	35	9:53	35	10:03
40	25	4:03	30	7:28	35	10:08	35	10:18	35	10:28	35	10:38

Saturation Depth 82.0 fsw (continued)

TDT	12:00		18:00		24:00		30:00		36:00		40:00	
P(DCS)	---34.3---		---26.4---		---18.8---		---11.8---		--- 6.1---		--- 3.2---	
Stop Depth (fsw)	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM
39	25	4:29	30	7:59	35	10:44	35	10:54	40	11:09	40	11:19
38	25	4:54	30	8:29	35	11:19	35	11:29	35	11:44	35	11:54
37	25	5:19	30	8:59	35	11:54	40	12:09	40	12:24	40	12:34
36	25	5:44	30	9:29	40	12:34	40	12:49	40	13:04	40	13:14
35	25	6:09	30	9:59	35	13:09	35	13:24	40	13:44	40	13:54
34	25	6:35	35	10:35	40	13:50	40	14:05	40	14:25	40	14:35
33	25	6:60	30	11:05	40	14:30	40	14:45	40	15:05	40	15:15
32	30	7:30	35	11:40	40	15:10	40	15:25	40	15:45	45	16:00
31	25	7:55	35	12:15	40	15:50	40	16:05	40	16:25	40	16:40
30	25	8:20	30	12:45	40	16:30	45	16:50	45	17:10	45	17:25
29	25	8:46	35	13:21	40	17:11	40	17:31	45	17:56	45	18:11
28	20	9:06	30	13:51	45	17:56	45	18:16	45	18:41	45	18:56
27	20	9:26	30	14:21	45	18:41	45	19:01	45	19:26	45	19:41
26	20	9:46	30	14:51	45	19:26	45	19:46	45	20:11	45	20:26
25	20	10:06	30	15:21	45	20:11	45	20:31	45	20:56	45	21:11
24	15	10:22	25	15:47	45	20:57	50	21:22	50	21:47	50	22:02
23	15	10:37	20	16:07	35	21:32	45	22:07	45	22:32	50	22:52
22	15	10:52	20	16:27	25	21:57	50	22:57	50	23:22	50	23:42
21	10	11:02	15	16:42	25	22:22	50	23:47	50	24:12	50	24:32
20	15	11:17	15	16:57	20	22:42	50	24:37	55	25:07	55	25:27
19	10	11:28	15	17:13	15	22:58	50	25:28	50	25:58	55	26:23
18	10	11:38	10	17:23	15	23:13	55	26:23	55	26:53	55	27:18
17	5	11:43	10	17:33	15	23:28	55	27:18	55	27:48	55	28:13

Saturation Depth 82.0 fsw (continued)

TDT	12:00		18:00		24:00		30:00		36:00		40:00	
P(DCS)	---34.3---		---26.4---		---18.8---		---11.8---		--- 6.1---		--- 3.2---	
Stop Depth (fsw)	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM
16	5	11:48	10	17:43	10	23:38	50	28:08	55	28:43	55	29:08
15	0	11:48	0	17:43	5	23:43	55	29:03	60	29:43	60	30:08
14	5	11:54	5	17:49	5	23:49	45	29:49	60	30:44	60	31:09
13	5	11:59	5	17:54	5	23:54	5	29:54	60	31:44	60	32:09
12	0	11:59	0	17:54	0	23:54	0	29:54	60	32:44	65	33:14
11	0	11:59	5	17:59	5	23:59	5	29:59	65	33:49	65	34:19
10	0	11:59	0	17:59	0	23:59	0	29:59	65	34:54	65	35:24
9	0	11:60	0	17:60	0	23:60	0	29:60	60	35:55	70	36:35
8	0	11:60	0	17:60	0	23:60	0	29:60	5	35:60	70	37:45
7	0	12:00	0	17:60	0	23:60	0	29:60	0	35:60	70	38:55
6	0	12:00	0	18:00	0	24:00	0	30:00	0	36:00	65	40:00
0	0	12:01	0	18:01	0	24:01	0	30:01	0	36:01	0	40:01
TST	705		1065		1425		1785		2145		2385	

Saturation Depth 99.0 (fsw)
Travel rate 5.0 (fsw/min)
Elapsed Time (Elps Time) until leaving that stop depth

TDT	12:00		18:00		24:00		30:00		36:00		44:00	
P(DCS)	---42.1---		---34.0---		---26.3---		---18.8---		---11.8---		--- 4.6---	
Stop Depth (fsw)	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM
72	0	0:05	0	0:05	5	0:10	10	0:15	15	0:20	25	0:30
71	0	0:06	0	0:06	5	0:16	25	0:41	25	0:46	25	0:56
70	5	0:11	5	0:11	10	0:26	25	1:06	25	1:11	25	1:21
69	5	0:16	5	0:16	5	0:31	25	1:31	25	1:36	25	1:46
68	0	0:16	0	0:16	20	0:51	25	1:56	25	2:01	25	2:11
67	5	0:21	10	0:26	20	1:11	25	2:21	25	2:26	25	2:36
66	5	0:27	5	0:32	25	1:37	25	2:47	30	2:57	30	3:07
65	0	0:27	0	0:32	25	2:02	25	3:12	25	3:22	25	3:32
64	5	0:32	10	0:42	20	2:22	25	3:37	25	3:47	25	3:57
63	5	0:37	5	0:47	25	2:47	25	4:02	25	4:12	25	4:22
62	0	0:37	5	0:52	20	3:07	30	4:32	30	4:42	30	4:52
61	5	0:43	20	1:13	25	3:33	25	4:58	25	5:08	25	5:18
60	5	0:48	20	1:33	25	3:58	30	5:28	30	5:38	30	5:48
59	0	0:48	20	1:53	25	4:23	25	5:53	30	6:08	30	6:18
58	5	0:53	25	2:18	25	4:48	25	6:18	25	6:33	25	6:43
57	10	1:03	20	2:38	25	5:13	30	6:48	30	7:03	30	7:13
56	5	1:09	20	2:59	25	5:39	30	7:19	30	7:34	30	7:44
55	5	1:14	20	3:19	25	6:04	30	7:49	30	8:04	30	8:14
54	5	1:19	20	3:39	25	6:29	30	8:19	30	8:34	30	8:44
53	10	1:29	25	4:04	30	6:59	30	8:49	30	9:04	30	9:14
52	15	1:44	20	4:24	25	7:24	30	9:19	30	9:34	30	9:44

Saturation Depth 99.0 fsw (continued)

TDT	12:00		18:00		24:00		30:00		36:00		44:00	
P(DCS)	---42.1---		---34.0---		---26.3---		---18.8---		---11.8---		--- 4.6---	
Stop Depth (fsw)	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM
51	15	1:60	25	4:50	30	7:55	30	9:50	30	10:05	35	10:20
50	20	2:20	20	5:10	25	8:20	30	10:20	30	10:35	30	10:50
49	20	2:40	25	5:35	25	8:45	35	10:55	35	11:10	35	11:25
48	20	3:00	25	6:00	30	9:15	30	11:25	30	11:40	30	11:55
47	20	3:20	20	6:20	25	9:40	30	11:55	30	12:10	30	12:25
46	20	3:41	25	6:46	30	10:11	35	12:31	35	12:46	35	13:01
45	20	4:01	25	7:11	25	10:36	35	13:06	35	13:21	35	13:36
44	20	4:21	25	7:36	30	11:06	30	13:36	30	13:51	35	14:11
43	20	4:41	25	8:01	30	11:36	35	14:11	35	14:26	35	14:46
42	20	5:01	25	8:26	30	12:06	35	14:46	35	15:01	35	15:21
41	20	5:22	25	8:52	30	12:37	35	15:22	35	15:37	35	15:57
40	20	5:42	25	9:17	30	13:07	35	15:57	35	16:12	35	16:32
39	20	6:02	25	9:42	30	13:37	35	16:32	40	16:52	40	17:12
38	25	6:27	25	10:07	30	14:07	35	17:07	35	17:27	35	17:47
37	20	6:47	30	10:37	35	14:42	35	17:42	40	18:07	40	18:27
36	25	7:13	25	11:03	30	15:13	40	18:23	40	18:48	40	19:08
35	20	7:33	30	11:33	35	15:48	35	18:58	35	19:23	35	19:43
34	20	7:53	25	11:58	30	16:18	40	19:38	40	20:03	40	20:23
33	25	8:18	30	12:28	35	16:53	40	20:18	40	20:43	45	21:08
32	20	8:38	25	12:53	30	17:23	40	20:58	40	21:23	40	21:48
31	20	8:59	30	13:24	35	17:59	40	21:39	40	22:04	40	22:29
30	20	9:19	30	13:54	35	18:34	40	22:19	40	22:44	45	23:14
29	15	9:34	25	14:19	30	19:04	45	23:04	45	23:29	45	23:59
28	15	9:49	25	14:44	35	19:39	40	23:44	40	24:09	45	24:44

Saturation Depth 99.0 fsw (continued)

TDT	12:00		18:00		24:00		30:00		36:00		44:00	
P(DCS)	---42.1---		---34.0---		---26.3---		---18.8---		---11.8---		--- 4.6---	
Stop Depth (fsw)	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM
27	15	10:04	25	15:09	30	20:09	45	24:29	45	24:54	45	25:29
26	15	10:20	20	15:30	30	20:40	45	25:15	45	25:40	45	26:15
25	15	10:35	20	15:50	30	21:10	45	25:60	45	26:25	45	26:60
24	10	10:45	20	16:10	25	21:35	45	26:45	50	27:15	50	27:50
23	10	10:55	15	16:25	25	22:00	40	27:25	45	28:00	50	28:40
22	10	11:05	15	16:40	20	22:20	30	27:55	50	28:50	50	29:30
21	10	11:16	15	16:56	15	22:36	25	28:21	50	29:41	50	30:21
20	10	11:26	15	17:11	15	22:51	20	28:41	50	30:31	55	31:16
19	10	11:36	10	17:21	15	23:06	15	28:56	50	31:21	50	32:06
18	5	11:41	10	17:31	15	23:21	15	29:11	50	32:11	55	33:01
17	0	11:41	10	17:41	10	23:31	10	29:21	55	33:06	55	33:56
16	5	11:47	5	17:47	10	23:42	15	29:37	55	34:02	55	34:52
15	5	11:52	5	17:52	5	23:47	10	29:47	55	34:57	60	35:52
14	0	11:52	0	17:52	0	23:47	0	29:47	50	35:47	60	36:52
13	5	11:57	5	17:57	5	23:52	5	29:52	5	35:52	60	37:52
12	0	11:57	0	17:57	0	23:52	0	29:52	0	35:52	60	38:52
11	0	11:58	0	17:58	5	23:58	5	29:58	5	35:58	65	39:58
10	0	11:58	0	17:58	0	23:58	0	29:58	0	35:58	65	41:03
9	0	11:58	0	17:58	0	23:58	0	29:58	0	35:58	70	42:13
8	0	11:58	0	17:58	0	23:58	0	29:58	0	35:58	65	43:18
7	0	11:58	0	17:58	0	23:58	0	29:58	0	35:58	40	43:58
0	0	11:60	0	17:60	0	23:60	0	29:60	0	35:60	0	43:60
TST	700		1060		1420		1780		2140		2620	

Saturation Depth 115.0 (fsw)
Travel rate 5.0 (fsw/min)
Elapsed Time (Elps Time) until leaving that stop depth

TDT	12:00		18:00		24:00		30:00		36:00		44:00		52:00	
P(DCS)	---48.5---		---40.2---		---32.5---		---25.0---		---17.5---		--- 8.8---		--- 2.7---	
Stop Depth (fsw)	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM
85	0	0:06	0	0:06	0	0:06	0	0:06	5	0:11	5	0:11	10	0:16
84	0	0:06	0	0:06	0	0:06	10	0:16	20	0:31	25	0:36	25	0:41
83	5	0:11	5	0:11	5	0:11	10	0:26	20	0:51	20	0:56	20	1:01
82	0	0:12	0	0:12	5	0:17	20	0:47	25	1:17	25	1:22	25	1:27
81	5	0:17	5	0:17	5	0:22	20	1:07	20	1:37	25	1:47	25	1:52
80	0	0:17	0	0:17	5	0:27	20	1:27	20	1:57	20	2:07	20	2:12
79	5	0:22	5	0:22	5	0:32	25	1:52	25	2:22	25	2:32	25	2:37
78	0	0:22	0	0:22	5	0:37	20	2:12	25	2:47	25	2:57	25	3:02
77	5	0:28	5	0:28	5	0:43	20	2:33	20	3:08	20	3:18	20	3:23
76	5	0:33	5	0:33	10	0:53	25	2:58	25	3:33	25	3:43	25	3:48
75	0	0:33	0	0:33	15	1:08	20	3:18	20	3:53	20	4:03	25	4:13
74	5	0:38	5	0:38	20	1:28	20	3:38	25	4:18	25	4:28	25	4:38
73	0	0:38	5	0:43	20	1:48	20	3:58	25	4:43	25	4:53	25	5:03
72	5	0:44	5	0:49	20	2:09	25	4:24	25	5:09	25	5:19	25	5:29
71	0	0:44	5	0:54	20	2:29	20	4:44	25	5:34	25	5:44	25	5:54
70	5	0:49	5	0:59	20	2:49	25	5:09	25	5:59	25	6:09	25	6:19
69	5	0:54	5	1:04	20	3:09	20	5:29	20	6:19	25	6:34	25	6:44
68	0	0:54	10	1:14	20	3:29	25	5:54	25	6:44	25	6:59	25	7:09
67	5	0:60	15	1:30	20	3:50	25	6:20	25	7:10	25	7:25	25	7:35
66	5	1:05	20	1:50	20	4:10	20	6:40	30	7:40	30	7:55	30	8:05
65	0	1:05	15	2:05	20	4:30	25	7:05	25	8:05	25	8:20	25	8:30
64	5	1:10	20	2:25	25	4:55	25	7:30	25	8:30	25	8:45	30	9:00
63	5	1:15	15	2:40	20	5:15	25	7:55	25	8:55	25	9:10	25	9:25
62	0	1:16	20	3:01	20	5:36	25	8:21	30	9:26	30	9:41	30	9:56
61	10	1:26	20	3:21	20	5:56	25	8:46	25	9:51	25	10:06	25	10:21

Saturation Depth 115.0 fsw (continued)

TDT	12:00		18:00		24:00		30:00		36:00		44:00		52:00	
P(DCS)	---48.5---		---40.2---		---32.5---		---25.0---		---17.5---		--- 8.8---		--- 2.7---	
Stop Depth (fsw)	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM
60	5	1:31	20	3:41	25	6:21	25	9:11	30	10:21	30	10:36	30	10:51
59	5	1:36	15	3:56	20	6:41	25	9:36	25	10:46	25	11:01	25	11:16
58	10	1:46	20	4:16	20	7:01	25	10:01	30	11:16	30	11:31	30	11:46
57	5	1:52	15	4:32	25	7:27	25	10:27	30	11:47	30	12:02	30	12:17
56	15	2:07	20	4:52	20	7:47	25	10:52	25	12:12	30	12:32	30	12:47
55	20	2:27	20	5:12	25	8:12	30	11:22	30	12:42	30	13:02	30	13:17
54	15	2:42	20	5:32	20	8:32	25	11:47	30	13:12	30	13:32	30	13:47
53	20	3:02	20	5:52	25	8:57	30	12:17	30	13:42	30	14:02	30	14:17
52	15	3:18	20	6:13	25	9:23	25	12:43	30	14:13	30	14:33	30	14:48
51	15	3:33	20	6:33	25	9:48	30	13:13	30	14:43	30	15:03	35	15:23
50	15	3:48	20	6:53	25	10:13	25	13:38	30	15:13	30	15:33	30	15:53
49	20	4:08	20	7:13	25	10:38	30	14:08	35	15:48	35	16:08	35	16:28
48	15	4:23	20	7:33	25	11:03	25	14:33	30	16:18	30	16:38	30	16:58
47	20	4:44	25	7:59	25	11:29	30	15:04	35	16:54	35	17:14	35	17:34
46	20	5:04	20	8:19	25	11:54	30	15:34	30	17:24	30	17:44	30	18:04
45	20	5:24	25	8:44	25	12:19	30	16:04	35	17:59	35	18:19	35	18:39
44	15	5:39	20	9:04	25	12:44	30	16:34	30	18:29	35	18:54	35	19:14
43	20	5:59	20	9:24	25	13:09	30	17:04	35	19:04	35	19:29	35	19:49
42	15	6:15	25	9:50	25	13:35	30	17:35	35	19:40	35	20:05	35	20:25
41	20	6:35	20	10:10	30	14:05	30	18:05	35	20:15	35	20:40	40	21:05
40	20	6:55	25	10:35	25	14:30	35	18:40	35	20:50	35	21:15	35	21:40
39	20	7:15	25	11:00	30	15:00	30	19:10	40	21:30	40	21:55	40	22:20
38	15	7:30	20	11:20	25	15:25	35	19:45	35	22:05	35	22:30	35	22:55
37	20	7:51	25	11:46	30	15:56	30	20:16	35	22:41	35	23:06	40	23:36
36	20	8:11	25	12:11	25	16:21	35	20:51	40	23:21	40	23:46	40	24:16
35	20	8:31	25	12:36	30	16:51	30	21:21	40	24:01	40	24:26	40	24:56

Saturation Depth 115.0 fsw (continued)

TDT	12:00		18:00		24:00		30:00		36:00		44:00		52:00	
P(DCS)	---48.5---		---40.2---		---32.5---		---25.0---		---17.5---		--- 8.8---		--- 2.7---	
Stop Depth (fsw)	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM
34	15	8:46	25	13:01	30	17:21	35	21:56	35	24:36	40	25:06	40	25:36
33	15	9:01	25	13:26	30	17:51	35	22:31	40	25:16	40	25:46	40	26:16
32	15	9:17	25	13:52	30	18:22	35	23:07	40	25:57	40	26:27	40	26:57
31	15	9:32	20	14:12	30	18:52	35	23:42	40	26:37	40	27:07	45	27:42
30	15	9:47	25	14:37	30	19:22	35	24:17	40	27:17	40	27:47	40	28:22
29	15	10:02	20	14:57	30	19:52	35	24:52	45	28:02	45	28:32	45	29:07
28	15	10:17	25	15:22	30	20:22	35	25:27	40	28:42	45	29:17	45	29:52
27	10	10:28	20	15:43	25	20:48	35	26:03	45	29:28	45	30:03	45	30:38
26	10	10:38	15	15:58	25	21:13	30	26:33	45	30:13	45	30:48	50	31:28
25	10	10:48	15	16:13	20	21:33	30	27:03	45	30:58	45	31:33	45	32:13
24	10	10:58	15	16:28	25	21:58	25	27:28	45	31:43	45	32:18	50	33:03
23	10	11:08	15	16:43	20	22:18	25	27:53	45	32:28	50	33:08	50	33:53
22	10	11:19	10	16:54	15	22:34	20	28:14	50	33:19	50	33:59	50	34:44
21	5	11:24	10	17:04	15	22:49	20	28:34	45	34:04	50	34:49	50	35:34
20	10	11:34	10	17:14	15	23:04	15	28:49	25	34:29	50	35:39	50	36:24
19	5	11:39	10	17:24	10	23:14	15	29:04	20	34:49	55	36:34	55	37:19
18	0	11:39	10	17:34	10	23:24	15	29:19	15	35:04	50	37:24	55	38:14
17	5	11:45	5	17:40	10	23:35	10	29:30	15	35:20	55	38:20	55	39:10
16	5	11:50	5	17:45	10	23:45	10	29:40	15	35:35	55	39:15	60	40:10
15	0	11:50	0	17:45	0	23:45	0	29:40	5	35:40	55	40:10	60	41:10
14	5	11:55	5	17:50	5	23:50	5	29:45	5	35:45	60	41:10	60	42:10
13	0	11:55	5	17:55	5	23:55	5	29:50	5	35:50	60	42:10	60	43:10
12	0	11:56	0	17:56	0	23:56	0	29:51	0	35:51	60	43:11	65	44:16
11	0	11:56	0	17:56	0	23:56	5	29:56	5	35:56	40	43:51	65	45:21
10	0	11:56	0	17:56	0	23:56	0	29:56	0	35:56	5	43:56	65	46:26

Saturation Depth 115.0 fsw (continued)

TDT	12:00		18:00		24:00		30:00		36:00		44:00		52:00	
P(DCS)	---48.5---		---40.2---		---32.5---		---25.0---		---17.5---		--- 8.8---		--- 2.7---	
Stop Depth (fsw)	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM
9	0	11:56	0	17:56	0	23:56	0	29:56	0	35:56	0	43:56	70	47:36
8	0	11:56	0	17:56	0	23:56	0	29:56	0	35:56	0	43:56	70	48:46
7	0	11:57	0	17:57	0	23:57	0	29:57	0	35:57	0	43:57	70	49:57
6	0	11:57	0	17:57	0	23:57	0	29:57	0	35:57	0	43:57	75	51:12
5	0	11:57	0	17:57	0	23:57	0	29:57	0	35:57	0	43:57	45	51:57
0	0	11:58	0	17:58	0	23:58	0	29:58	0	35:58	0	43:58	0	51:58
TST	695		1055		1415		1775		2135		2615		3095	

Saturation Depth 132.0 (fsw)
Travel rate 5.0 (fsw/min)
Elapsed Time (Elps Time) until leaving that stop depth

TDT	18:00		24:00		30:00		36:00		44:00		52:00		56:00	
P(DCS)	---45.8---		---38.1---		---30.6---		---23.2---		---13.5---		--- 5.8---		--- 3.0---	
Stop Depth (fsw)	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM
98	0	0:07	0	0:07	5	0:12	5	0:12	10	0:17	15	0:22	20	0:27
97	0	0:07	0	0:07	0	0:12	20	0:32	20	0:37	20	0:42	20	0:47
96	5	0:12	5	0:12	5	0:17	20	0:52	20	0:57	20	1:02	20	1:07
95	0	0:12	0	0:12	5	0:22	20	1:12	20	1:17	20	1:22	20	1:27
94	5	0:18	5	0:18	5	0:28	20	1:33	20	1:38	20	1:43	20	1:48
93	0	0:18	0	0:18	0	0:28	20	1:53	20	1:58	20	2:03	20	2:08
92	5	0:23	5	0:23	10	0:38	20	2:13	20	2:18	20	2:23	20	2:28
91	0	0:23	5	0:28	15	0:53	20	2:33	20	2:38	20	2:43	20	2:48
90	5	0:28	5	0:33	20	1:13	20	2:53	20	2:58	25	3:08	25	3:13
89	0	0:29	0	0:34	20	1:34	20	3:14	20	3:19	20	3:29	20	3:34
88	5	0:34	5	0:39	15	1:49	20	3:34	20	3:39	20	3:49	20	3:54
87	0	0:34	5	0:44	15	2:04	20	3:54	25	4:04	25	4:14	25	4:19
86	5	0:39	5	0:49	20	2:24	20	4:14	20	4:24	20	4:34	20	4:39
85	0	0:39	5	0:54	20	2:44	20	4:34	20	4:44	20	4:54	20	4:59
84	5	0:45	10	1:05	15	2:60	20	4:55	20	5:05	20	5:15	20	5:20
83	0	0:45	15	1:20	20	3:20	25	5:20	25	5:30	25	5:40	25	5:45
82	5	0:50	15	1:35	20	3:40	20	5:40	20	5:50	20	6:00	20	6:05
81	0	0:50	20	1:55	20	4:00	20	6:00	20	6:10	20	6:20	20	6:25
80	5	0:55	15	2:10	20	4:20	25	6:25	25	6:35	25	6:45	25	6:50
79	5	1:01	15	2:26	20	4:41	25	6:51	25	7:01	25	7:11	25	7:16
78	5	1:06	15	2:41	15	4:56	20	7:11	20	7:21	20	7:31	20	7:36
77	5	1:11	20	3:01	20	5:16	25	7:36	25	7:46	25	7:56	25	8:01
76	5	1:16	15	3:16	20	5:36	20	7:56	25	8:11	25	8:21	25	8:26
75	5	1:21	20	3:36	20	5:56	25	8:21	25	8:36	25	8:46	25	8:51

TDT	18:00		24:00		30:00		36:00		44:00		52:00		56:00	
P(DCS)	---45.8---		---38.1---		---30.6---		---23.2---		---13.5---		--- 5.8---		--- 3.0---	
Stop Depth (fsw)	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM
74	10	1:32	15	3:52	20	6:17	20	8:42	20	8:57	25	9:12	25	9:17
73	15	1:47	20	4:12	20	6:37	25	9:07	25	9:22	25	9:37	25	9:42
72	15	2:02	15	4:27	20	6:57	20	9:27	25	9:47	25	10:02	25	10:07
71	15	2:17	20	4:47	20	7:17	25	9:52	25	10:12	25	10:27	25	10:32
70	15	2:32	15	5:02	20	7:37	20	10:12	25	10:37	25	10:52	25	10:57
69	15	2:48	20	5:23	20	7:58	25	10:38	25	11:03	25	11:18	25	11:23
68	15	3:03	15	5:38	20	8:18	25	11:03	25	11:28	25	11:43	25	11:48
67	15	3:18	20	5:58	25	8:43	25	11:28	25	11:53	25	12:08	25	12:13
66	15	3:33	20	6:18	20	9:03	25	11:53	25	12:18	25	12:33	25	12:38
65	20	3:53	20	6:38	20	9:23	25	12:18	30	12:48	30	13:03	30	13:08
64	15	4:09	15	6:54	25	9:49	25	12:44	25	13:14	25	13:29	25	13:34
63	15	4:24	20	7:14	20	10:09	25	13:09	25	13:39	25	13:54	25	13:59
62	15	4:39	20	7:34	25	10:34	25	13:34	30	14:09	30	14:24	30	14:29
61	20	4:59	20	7:54	20	10:54	25	13:59	25	14:34	25	14:49	25	14:54
60	15	5:14	20	8:14	25	11:19	25	14:24	25	14:59	30	15:19	30	15:24
59	20	5:35	20	8:35	20	11:40	30	14:55	30	15:30	30	15:50	30	15:55
58	15	5:50	20	8:55	25	12:05	25	15:20	25	15:55	25	16:15	30	16:25
57	20	6:10	20	9:15	20	12:25	30	15:50	30	16:25	30	16:45	30	16:55
56	20	6:30	20	9:35	25	12:50	25	16:15	30	16:55	30	17:15	30	17:25
55	15	6:45	25	10:00	25	13:15	30	16:45	30	17:25	30	17:45	30	17:55
54	20	7:06	20	10:21	25	13:41	25	17:11	30	17:56	30	18:16	30	18:26
53	15	7:21	20	10:41	25	14:06	25	17:36	30	18:26	30	18:46	30	18:56
52	20	7:41	20	11:01	25	14:31	30	18:06	30	18:56	30	19:16	30	19:26
51	15	7:56	25	11:26	25	14:56	25	18:31	30	19:26	30	19:46	30	19:56
50	20	8:16	20	11:46	25	15:21	30	19:01	30	19:56	35	20:21	35	20:31
49	20	8:37	25	12:12	25	15:47	30	19:32	30	20:27	30	20:52	30	21:02
48	20	8:57	25	12:37	25	16:12	30	20:02	35	21:02	35	21:27	35	21:37

Saturation Depth 132.0 fsw (continued)

TDT	18:00		24:00		30:00		36:00		44:00		52:00		56:00	
P(DCS)	---45.8---		---38.1---		---30.6---		---23.2---		---13.5---		--- 5.8---		--- 3.0---	
Stop Depth (fsw)	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM
47	20	9:17	20	12:57	25	16:37	30	20:32	30	21:32	30	21:57	30	22:07
46	20	9:37	20	13:17	30	17:07	30	21:02	35	22:07	35	22:32	35	22:42
45	20	9:57	25	13:42	25	17:32	30	21:32	35	22:42	35	23:07	35	23:17
44	20	10:18	25	14:08	25	17:58	30	22:03	30	23:13	35	23:43	35	23:53
43	20	10:38	25	14:33	30	18:28	35	22:38	35	23:48	35	24:18	35	24:28
42	20	10:58	25	14:58	30	18:58	30	23:08	35	24:23	35	24:53	35	25:03
41	25	11:23	25	15:23	30	19:28	30	23:38	35	24:58	35	25:28	35	25:38
40	20	11:43	25	15:48	25	19:53	35	24:13	35	25:33	35	26:03	35	26:13
39	20	12:04	25	16:14	30	20:24	30	24:44	35	26:09	35	26:39	40	26:54
38	25	12:29	25	16:39	30	20:54	35	25:19	40	26:49	40	27:19	40	27:34
37	20	12:49	25	17:04	30	21:24	35	25:54	35	27:24	35	27:54	35	28:09
36	20	13:09	25	17:29	30	21:54	35	26:29	40	28:04	40	28:34	40	28:49
35	25	13:34	25	17:54	30	22:24	35	27:04	40	28:44	40	29:14	40	29:29
34	20	13:55	25	18:20	30	22:55	35	27:40	40	29:25	40	29:55	40	30:10
33	25	14:20	30	18:50	35	23:30	35	28:15	40	30:05	40	30:35	40	30:50
32	20	14:40	25	19:15	30	23:60	35	28:50	40	30:45	40	31:15	40	31:30
31	20	15:00	25	19:40	30	24:30	35	29:25	40	31:25	45	32:00	45	32:15
30	15	15:15	25	20:05	35	25:05	40	30:05	40	32:05	40	32:40	40	32:55
29	20	15:36	25	20:31	30	25:36	35	30:41	45	32:51	45	33:26	45	33:41
28	15	15:51	25	20:56	30	26:06	35	31:16	40	33:31	45	34:11	45	34:26
27	15	16:06	25	21:21	30	26:36	35	31:51	45	34:16	45	34:56	45	35:11
26	15	16:21	20	21:41	25	27:01	35	32:26	45	35:01	45	35:41	50	36:01
25	15	16:36	20	22:01	25	27:26	30	32:56	45	35:46	45	36:26	45	36:46
24	10	16:47	15	22:17	25	27:52	30	33:27	50	36:37	50	37:17	50	37:37
23	15	17:02	15	22:32	20	28:12	25	33:52	45	37:22	45	38:02	50	38:27
22	10	17:12	15	22:47	20	28:32	20	34:12	50	38:12	50	38:52	50	39:17

Saturation Depth 132.0 fsw (continued)

TDT	18:00		24:00		30:00		36:00		44:00		52:00		56:00	
P(DCS)	---45.8---		---38.1---		---30.6---		---23.2---		---13.5---		--- 5.8---		--- 3.0---	
Stop Depth (fsw)	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM	Stop Time (min)	Elps Time HH:MM
21	10	17:22	15	23:02	15	28:47	20	34:32	50	39:02	50	39:42	50	40:07
20	10	17:32	10	23:12	15	29:02	15	34:47	50	39:52	55	40:37	55	41:02
19	5	17:38	10	23:23	10	29:13	15	35:03	50	40:43	50	41:28	50	41:53
18	5	17:43	10	23:33	15	29:28	15	35:18	50	41:33	55	42:23	55	42:48
17	5	17:48	10	23:43	10	29:38	10	35:28	55	42:28	55	43:18	55	43:43
16	0	17:48	0	23:43	5	29:43	15	35:43	50	43:18	55	44:13	60	44:43
15	5	17:53	5	23:48	5	29:48	5	35:48	25	43:43	60	45:13	60	45:43
14	5	17:59	5	23:54	5	29:54	5	35:54	5	43:49	60	46:14	60	46:44
13	0	17:59	0	23:54	0	29:54	0	35:54	0	43:49	60	47:14	60	47:44
12	0	17:59	5	23:59	5	29:59	5	35:59	5	43:54	60	48:14	65	48:49
11	0	17:59	0	23:59	0	29:59	0	35:59	0	43:54	65	49:19	65	49:54
10	0	17:59	0	23:59	0	29:59	0	35:59	5	43:59	65	50:24	65	50:59
9	0	17:60	0	23:60	0	29:60	0	35:60	0	43:60	65	51:30	70	52:10
8	0	17:60	0	23:60	0	29:60	0	35:60	0	43:60	30	51:60	70	53:20
7	0	17:60	0	23:60	0	29:60	0	35:60	0	43:60	0	51:60	70	54:30
6	0	18:00	0	24:00	0	30:00	0	36:00	0	44:00	0	52:00	75	55:45
5	0	18:00	0	24:00	0	30:00	0	36:00	0	44:00	0	52:00	15	56:00
0	0	18:01	0	24:01	0	30:01	0	36:01	0	44:01	0	52:01	0	56:01
TST	1055		1415		1775		2135		2615		3095		3335	

Appendix 3: Time Constrained Tables Software for Windows 3.11

Installation

1. Close all of the active programs running on your system. If Windows has been up for a while on your machine it is best to fresh start the Windows before installation.
2. Insert the first of the diskettes into your 3.5" drive.
3. Execute SETUP.EXE from the diskette.
   (Use "File" command from the menu, then "Run" command, then type a:setup to run the setup program. Or use file manager to display the files from the diskette and double click of SETUP.EXE to execute the setup program.)
4. Follow the instructions in the installation procedure.

Note: The installation procedure will create a subdirectory c:\CNSTX on your "c" drive. It will also create a new program group window called CNSTX where the Time Constrained Tables program will reside.

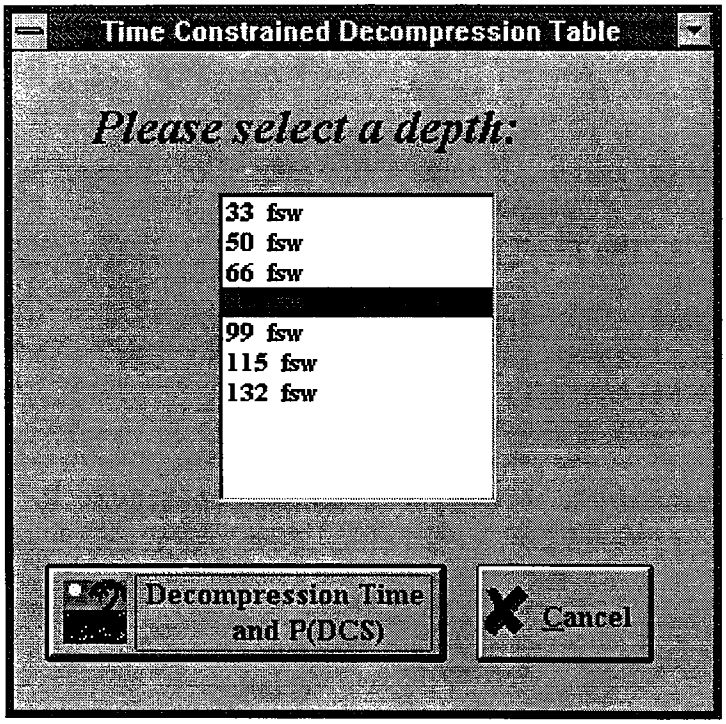
User's Guide

First screen displays a list of saturation depths for which precomputed schedules are available. Select one of the depths and click on the button marked "Decompression Time and P(DCS)" which will activate the second screen. "Cancel" button will end the program.

Note: It may take some time to activate the second screen (or the first screen at the beginning) depending upon the cpu speed and memory available.

The second screen displays total decompression time and corresponding P(DCS) for available schedules. You can view the selected schedule by clicking on the "View" button. A selected schedule can also be printed by clicking on the "Print" button. The "Cancel" button will bring back the first screen.

Following three pages contain sample screens and a sample printed schedule.


Time Constrained Decompression Table
Please select a depth:
33 fsw
50 fsw
66 fsw
99 fsw
115 fsw
132 fsw
Decompression Time and P(DCS)
Cancel

Total Decompression Time and P(DCS)

for depth: 82 (fsw)

Hours(hh:mm)	P(DCS)
0 :16	56.6%
0 :46	54.9%
1 :16	53.4%
1 :46	51.9%
2 :16	50.5%
2 :46	49.2%
3 :16	48.5%
3 :46	47.2%
4 :16	46.9%
4 :46	45.2%
5 :16	44.4%
5 :46	43.5%
6 :16	42.7%
6 :46	41.9%
7 :16	41.1%
7 :46	40.4%

View Print Cancel

Date: 2/10/98 Time: 11:19:20 AM

Saturation Depth (fsw)	:	82
Total Decompression Time (HH:MM)	:	8:16
Travel rate (fsw/min)	:	5
P(DCS)	:	39.6%

Elapsed Time: time at leaving that stop depth

Stop Depth (fsw)	Stop Time (Minutes)	Elapsed Time (HH:MM)
57	5	0 :10
56	5	0 :15
55	5	0 :20
54	5	0 :25
53	0	0 :26
52	5	0 :31
51	5	0 :36
50	5	0 :41
49	5	0 :46
48	0	0 :47
47	5	0 :52
46	10	1 :02
45	5	1 :07
44	10	1 :17
43	5	1 :22
42	10	1 :33
41	10	1 :43
40	20	2 :03
39	20	2 :23
38	20	2 :43
37	25	3 :09
36	20	3 :29
35	20	3 :49
34	25	4 :14
33	20	4 :34
32	20	4 :55
31	20	5 :15
30	20	5 :35
29	15	5 :50
28	15	6 :05
27	15	6 :21
26	15	6 :36
25	15	6 :51
24	10	7 :01
23	15	7 :16
22	10	7 :27
21	10	7 :37
20	10	7 :47
19	5	7 :52
18	5	7 :57
17	5	8 :03
16	5	8 :08
15	0	8 :08
14	5	8 :13
0	0	8 :16